

CK

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AOKI, Atsushi

A. AOKI, ISHIDA &
ASSOCIATES, Toranomon 37 Mori
Bldg., 5-1, Toranomon
3-chome, Minato-ku, Tokyo
1058423 Japan

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) 14. 6. 2005

Applicant's or agent's file reference
R636-PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/JP2005/003428

International filing date (day/month/year)
23.02.2005

Priority date (day/month/year)
24.02.2004

International Patent Classification (IPC) or both national classification and IPC
IntCl.⁷ H01L33/00

Applicant
SHOWA DENKO K.K.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Date of completion of this opinion 27.05.2005

Name and mailing address of the ISA/JP

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

Tsuchiya Tomohisa

Telephone No. +81-3-3581-1101 Ext. 3255

2K 8826

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2005/003428

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/003428

Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

- ☐ paid additional fees
☐ paid additional fees under protest
☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

- ☐ complied with
☒ not complied with for the following reasons:

The subject matter of claim 1 does not appear to be novel with respect to JP 2003-101160 A ([0057], [0077]), JP 2003-179260 A ([0024]), JP 2004-6991 A ([0030]), JP 2003-78169 A (fig1&6).

The subject matter of claim 24 does not appear to be novel with respect to JP 2003-101160 A ([0057], [0077]), JP 2003-179260 A ([0024]), JP 2004-6991 A ([0030]).

So the subject matter of claim 1&24 does not have any new special technical features.

4. Consequently, this opinion has been established in respect of the following parts of the international application:

- ☐ all parts.
☒ the parts relating to claims Nos. 1, 2, 5, 17, 22, 24, 25.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2005/003428

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|--------------------------------|-----|
| Novelty (N) | Claims | | YES |
| | Claims | <u>1, 2, 5, 17, 22, 24, 25</u> | NO |
| Inventive step (IS) | Claims | | YES |
| | Claims | <u>1, 2, 5, 17, 22, 24, 25</u> | NO |
| Industrial applicability (IA) | Claims | <u>1, 2, 5, 17, 22, 24, 25</u> | YES |
| | Claims | | NO |

2. Citations and explanations

D1 : JP 2003-101160 A (NICHIA Corporation) 2003.04.04
D2 : JP 2003-179260 A (NICHIA Corporation) 2003.06.27
D3 : JP 2004-6991 A (NICHIA Corporation) 2004.01.08
D4 : JP 2003-78169 A (NICHIA Corporation) 2003.03.14

The subject matter of claim 1, 2, 5, 17, 22, 24, 25 does not meet the requirement of novelty. D1, D2 & D3 discloses a method for producing a gallium nitride compound semiconductor multilayer structure, wherein the method comprises doping the barrier layer with a dopant that is contained at a concentration of $1 \times 10^{17} \text{cm}^{-3}$ to $1 \times 10^{19} \text{cm}^{-3}$. So D1, D2 & D3 discloses a gallium nitride compound semiconductor multilayer structure, wherein the well layer comprises a thick portion and a thin portion, and the barrier layer contains a dopant. And D4 discloses a gallium nitride compound semiconductor multilayer structure, wherein the well layer comprises a thick portion and a thin portion, and the barrier layer contains a dopant.